



## What Is Oil ?

June, 2004

Oil is necessary to run our cars, heat our homes, produce plastics and other materials, but it is damaging to the environment when spilled. Oil type is one of many factors influencing spilled oil behavior. Because oil type influences spill impacts and cleanup techniques, and because hundreds of petroleum product cross the oceans as cargo or fuel, oil identification is one of the first tasks in response.

Oil is identified by the name of a crude oil field, by the kind of refined oil (such as jet fuel), or by more specific chemical analysis. Oils are also categorized into five generic density groups.

### Oil Types:

**Crude Oil:** Crude (unrefined) oil is extracted from underground petroleum deposits formed from buried prehistoric organic material under pressure. The chemical composition of crude oil varies greatly from different regions of the world and even within a single formation, based on geologic history.

Crude oils contain a range of “weights” of hydrocarbons, from light fractions similar to gasoline through heavy fractions made up of tars and waxes. While hydrocarbons make up 50-90% of crude oil, nitrogen, sulfur, and oxygen compounds as well as trace metals are also important.

**Refined Products:** Crude oil is transported to and processed in refineries into hundreds of different substances. Several refining methods are used to separate different weight fractions and further process crude oil. End products are refined oils containing a narrower range of crude oil constituents (such as gasoline, jet fuel, and home heating oil), and other petrochemicals and feedstocks.

### Five Major Oil Groups and Behaviors

#### Group I—Very Light (Jet Fuels, Gasoline)

- Highly volatile and flammable (evaporates quickly).
- High toxicity from soluble compounds.
- Toxicity causes localized, severe impacts to water column and intertidal resources.
- Resource recovery rate determines impact duration.
- Does not emulsify (water droplets in oil).
- Removal actions limited for safety and efficacy.

## **Group II–Light** (Diesel, No. 2, Light Crudes)

- Up to 1/3 of Group II crudes will remain as residue.
- Moderate toxicity from soluble compounds.
- May cause long-term intertidal contamination.
- Has potential for subtidal impacts (dissolution, mixing, sorption to suspended sediments).
- Chemical dispersant not usually warranted.
- Can emulsify (water droplets in oil).

## **Group III–Medium** (Most Crude Oils)

- About 1/3 will evaporate within 24 hours.
- May cause severe long-term intertidal impacts and severely impact bird and fur-bearing mammals.
- Chemical dispersion may be possible for 1-2 days.
- Can emulsify (water droplets in oil).
- Quick cleanup is most effective.

## **Group IV–Heavy** (Heavy Crudes, No.6, Bunker C)

- Little to no evaporation or dissolution.
- Heavy impacts to intertidal areas and waterfowl and fur-bearing mammals (coating and ingestion).
- Long-term sediment contamination is possible.
- Weathers very slowly.
- Dispersion seldom effective.
- Can emulsify (water droplets in oil).
- Shoreline cleanup difficult under all conditions.

## **Group V–Very Heavy** (Low API No. 6, Asphalt)

- Heavier than water – may float, have floating and sinking fractions, remain neutrally buoyant, or sink.
- No evaporation when submerged.

- Very viscous to semi-solid.
- Impacts from smothering, not toxicity.
- Weathers very slowly.
- Can emulsify (water droplets in oil).
- Subsurface cleanup technology limited

There is no such thing as a generic “oil spill”, as oil types significantly influence spill response techniques. Understanding oil types is key to effective response.

Report Oil or Chemical Spills to the National Response Center: 800-424-8802

In the event of a spill

- Contact the National Response Center at 800-424-8802

Suggested References about Oil Types

- Oil in the Sea, National Academy Press, 1985
- Introduction to Coastal Habitats and Biological Resources for Oil Spill Response, NOAA / Hazmat, Introduction to Oil Spill Physical and Chemical Processes and Information Management, NOAA / Hazmat, **[response.restoration.noaa.gov/oilaid.html](http://response.restoration.noaa.gov/oilaid.html)**
- EPA’s Oil Program Website, **[www.epa.gov/oilspill/](http://www.epa.gov/oilspill/)**
- National Response Team Web Site, **[www.nrt.org](http://www.nrt.org)**
- NOAA Hazardous Materials Response and Assessment Division, **[response.restoration.noaa.gov](http://response.restoration.noaa.gov)**
- Oil Spill Intelligence Report’s Oil Spill, Basics: A Primer for Students, **[www.cutter.com/osir/primer.htm](http://www.cutter.com/osir/primer.htm)**
- Department of Energy’s Energy Information Administration Web site: **[www.eia.doe.gov](http://www.eia.doe.gov)**
- American Petroleum Institute Web site: **[www.api.org](http://www.api.org)**